James Acker:
OK, I'm going to stretch myself for a moment, and then present on behalf of Natalia Chubarova, who cannot attend today, but did attend previous sessions of the workshop.

Our final presentation is from Dr. Natalia Chubarova, of Moscow State University. I believe that she had been personally acquainted with Greg Leptoukh, perhaps as part of the NEESPI project.

{Natalia Chubarova did not actually narrate, but provided the narration, so her name appears below}

Natalia Chubarova:
Giovanni is widely used in both the educational and scientific process at the Faculty of Geography, Moscow State University. In this presentation only several examples of its application will be shown. This slide demonstrates the main scientific aspects of our work, where Giovanni was actively used.

Spatial and temporal variability of aerosol properties over Northern Eurasia

Validation of aerosol retrievals against measurements at the Meteorological Observatory of Moscow State University and other Russian sites.

In order to obtain model UV fields over Europe within the framework of the COST 726 Project "Long Term Changes and Climatology of UV Radiation over Europe" we needed the climatology of aerosol
parameters in the UV spectral range. The method to obtain the UV climatology was based on aerosol optical thickness at 550 nm from MODIS (collection 5) for the 2000–2008 period combined with the aerosol products from the ground-based AERONET network with some additional thresholds and filtering of data.

This figure illustrates the developed monthly reconstructed variability of AOT at 340nm obtained from a composite of MODIS data (obtained via the Giovanni system ) and AERONET ground measurements.
The AOT at 340nm is shown to vary significantly from approximately 0.01 to 0.9 depending on the season and location.

Permanently elevated aerosol loading over several industrial areas is observed over Northern Italy, the coast of the Netherlands, the southern regions of Poland, and, especially in summer,

over the lowlands of the mid and low Danube areas.

The qualitative analysis of distribution of fine mode particles PM2.5 obtained from chemical transport model LOTOS-EUROS (Schaap et al., 2007) for 2000 (see http://home.planet.nl/scha1378/tno/promote/) has also confirmed the existence of local maxima approximately over the same regions.

The maximum monthly mean value can reach at 340nm 0.9 (at 550nm - 0.45) over Northern Italy during the spring-summer months, while AOT at 340nm is about 0.5 (AOT at 550nm = 0.25) over nearby unpolluted area.

Using aerosol climatology and TUV model complex, we estimated the effect of aerosol on UV index – a widely used parameter for characterization the dangerous level of UV irradiance. The analysis of relative changes in UV index values due to aerosol has revealed large spatial and temporal variations within −1 – −17%, with minimum UV index attenuation during cold period over the North Atlantic area, Scandinavia, etc.

The most significant loss (−15 – −17%) was estimated over Northern Italy in spring and in autumn due to high aerosol loading and lower solar elevations, compared with summer conditions. In winter, the UV index attenuation over Europe varies within 10% and increases on 3–5% over the polluted centres.

In spring and summer attenuation can reach −10 – -15% over the Central, Eastern and North-Eastern Europe.
In autumn, there is a pronounced decrease in loss over the whole European territory, except Northern Italy. The absolute loss of UV indices due to a positive correlation with both aerosol optical thickness and solar elevation is most pronounced over southern areas. The difference in UV index varies from less than 0.1 over the northern areas in winter up to 1.5 over polluted areas at the south (Northern Italy). However, significant variations in UV Index difference (within an order of magnitude) can be observed only due to aerosol optical thickness variations, especially in the south of Europe.

This is another example of Giovanni application in our data analysis:
The extreme fire event of 2010 over Moscow, using ground based data from AERONET, were analyzed and

they were compared with MODIS retrievals. The slide shows the time series obtained on August 7th 2010,
when according to ground based retrievals, the AOT reached 6.4!

In the right figure one can see a picture of MODIS AOT over Moscow with extremely high values close to 5, which is the threshold in MODIS algorithm for evaluating AOT. The gaps in MODIS AOT550 data within the fire area demonstrate the effect of this threshold application.

This slide is included after the discussion on the effects of aerosol on downwelling longwave irradiance.

Moscow Fires 2010. Ground-based measurements

This slide shows the educational aspects of Giovanni application at Moscow state University. Giovanni is used in seminars devoted to the satellite aerosol data in the course “Meteorological datasets”

It is also used during for student summer practice in different geographical regions of Russia and as a very useful tool in the research student projects.

Giovanni helps to get the students acquainted with different aerosol datasets including MODIS, MISR, OMI, etc. It is quite convenient to use friendly formats of data for having a quick look on the data and their variability. This activity is currently included in the course “Meteorological datasets” at the Chair of Meteorology and Climatology, Faculty of Geography Moscow State University.

The main aim is to learn student to critically analyze different sort of data and to reveal the climate related features from the data.

Here are some examples of the tasks concerning aerosol studies:
MODIS AOT 550 and Angstrom exponent comparison and their comparative analysis over different geographical regions- ocean and continental areas, as well as over large cities.

Comparison of different aerosol collections available in Giovanni.

Examples of student summer practices:
Volcanic aerosol plumes. The volcanic aerosol cloud migration from aerosol datasets and the comparisons with the backward trajectories analysis.

The distribution of fire aerosol plumes over European territory in July-August 2010 and its intensity together with backward trajectories analysis.

This is an example of volcanic aerosol plume at Kamchatka peninsula in July 2011 and its analysis using MODIS pictures obtained via Giovanni.

James Acker:
I also produced some aerosol plume images from the Sarychev Peak eruption.

Natalia Chubarova:
This is example of Konstantin Verichev's student research project, which was devoted to the development of corrected aerosol maps over Russia in different months on the basis of MODIS and ground-based aerosol measurements. MODIS data were obtained from the Giovanni system.

In order to choose the aerosol dataset the comparisons of different aerosol data against ground-based AERONET measurements were made over different sites in Russia. This is an example of monthly AOT550 from different aerosol dataset in Moscow.

By using mean fire power data set from the Giovanni portal, the regions where the fire smoke aerosol is dominating, were analyzed.

Using the aerosol and fire power data sets, the relationship between aerosol optical thickness and the fire monthly mean power in MW was analyzed. The data taken from Giovanni.

James Acker:
This is Natalia's final slide. I would also like to comment that the NASA Earth Observatory has many spectacular images of the summer fires in the Russian north from MODIS.

They may not seem so spectacular to the Russians who have to breathe the smoky air, but the images are striking.

I'd like to thank all the international presenters at this session, who made our workshop truly global.

Thanks for bearing with us as we learn the advantages and quirks of using WebEx as an electronic meeting format.